

A Journal for the Astronomical Computing Community?

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Abstract. One of the Birds of a Feather (BoF) discussion sessions at ADASS XX considered whether a new journal is needed to serve the astronomical computing community. In this paper we discuss the nature and requirements of that community, outline the analysis that led us to propose this as a topic for a BoF, and review the discussion from the BoF session itself. We also present the results from a survey designed to assess the suitability of astronomical computing papers of different kinds for publication in a range of existing astronomical and scientific computing journals. The discussion in the BoF session was somewhat inconclusive, and it seems likely that this topic will be debated again at a future ADASS or in a similar forum.

1. Introduction

The ADASS conference series is approaching the dawn of its third decade in robust health. The past twenty years have seen a marked increase in the importance of computation in support of astronomical research, and this trend seems set to continue, as the data volumes emerging from detectors and simulation codes increase exponentially. The ADASS proceedings volumes provide a very valuable record of each year's conference, but imperfectly record the activities of the ADASS community, for a number of reasons: (i) appearing up to a year after the conference, they often present out-of-date snapshots of rapidly-developing projects; (ii) being unrefereed, there is no quality threshold, nor are authors pushed to justify and elaborate where needed to provide the best account of their material; (iii) being tied to the annual conference cycle, projects are reported upon when the opportunity arises, not when they have reached appropriate milestones; and (iv) having restricted page lengths, topics receive only brief coverage.

This matters for at least two reasons. Firstly, material from most ADASS conference papers will be published nowhere else, so valuable technical lessons risk being lost. Secondly, as more people pursue a career in astronomical computing, it becomes more important that they have a means of recording their attainment and a track record of refereed journal papers, with associated citation statistics, is what is most readily understood by potential employers and assessors of promotion applications.

Open source publishing systems make the establishment of a community-driven astronomical computing journal possible, but is it necessary? Few papers on computational topics appear in mainstream astronomy journals, but is that a reflection of the journals' editorial policies or a lack of interest or confidence on the part of the community? Would mainstream astronomy journals publish more technical papers if they were submitted? Are there (scientific) computing journals that would welcome these

papers? What are the benefits of refereeing to this community and would it devote the time needed to referee? Does the lack of refereed publications hinder the career progress of its members?

2. The community

To the extent that there is an astronomical software community, it is represented by its attendance at, and support for, ADASS. Indeed, the primary publication outlet for many, or perhaps even most, of the ADASS attendees appears to be the ADASS proceedings, rather than a cluster of specialised or conventional journals. This is an odd situation for an academic discipline, and so the non-appearance of (the presumed non-null set of) software articles worthy of journal publication may have several possible explanations.

1. The primary output from the discipline is software, not articles: are these a better (or indeed usable) metric for recognition?
2. The members of the community tend to be in service roles – from those performing routine software development, to the managers of important parts of the astronomical community’s infrastructure – and so their career advancement may depend on publication to a lesser extent than conventional astronomers.
3. There may be no suitable publication outlets, since the existing astronomical journals are uninterested in publishing what they regard as computing science, and computing science journals are uninterested in publishing such applied work.
4. The community is perhaps such that there is not, or not yet, any *expectation* that software results will be published in journal form, and the community has therefore not developed any shared intuitions about what work is sufficiently valuable, or sufficiently interesting, for formal dissemination and careful preservation.

Problem 1 is too different a question to be considered here. Problem 2 may have been true in the past, but it is surely becoming less true, partly because there is more career crossover between software and observational astronomy now, than there has been in the past, and because with astronomy’s accelerating move towards HEP-scale experimentation, and the repeated warnings of the forthcoming ‘data deluge’, a broader range of software technologies have become integral to present and future astronomical practice. What this means in turn is that there is a growing number of individuals whose principal intellectual excitement, and whose principal contribution to astronomy, is *via* innovative software and system development. These people are not observers or theorists, nor are they computer scientists, but are instead something in between. The term *astroinformatics* seems convenient.

3. The survey

To test hypothesis 3, we mailed the editors of MNRAS, A&A, ApJ, Earth Science Informatics, Experimental Astronomy, CODATA Data Science Journal, Astronomische Nachrichten and PASP, with five titles and abstracts from last year’s ADASS proceedings. This set of five articles was chosen because each seemed typical of one or other class of publication commonly presented at ADASS, and we asked the editors to assess

whether the subject matter of the article, independently of its body, would be deemed sufficiently in scope for it to be passed on to a referee.

The article topics were: **alg** – software implementation of scientific algorithms (Bayesian techniques for classification); **app** – application progress report (WWT update); **pipe** – pipeline features and recent developments (detailed report of new IDL pipeline features); **gen** – application of general computing technologies to astronomy (application of Java and HPC techniques to a specific mission); **inf** – development and use of astronomy-specific ‘infrastructure’ (benefits of HEALPix in a particular application).

Table 1. Summary of journal survey results

	alg	app	pipe	gen	inf
A&A ¹	yes?	no? ²	?	no	?
MNRAS ³	no	no	no	no	no
ApJ ⁴	yes?	no? ⁵	yes??	no	yes??
ESIn ⁶	yes	yes	no?	yes	yes
DSJ ⁷	yes	yes	no?	yes	yes
PASP ⁸	yes	yes	no?	yes	yes

The responses are summarised in Table 1, and are published in full at the following website: <http://www.roe.ac.uk/~rgm/bof.html>.

Notes to Table 1: 1. Could appear in ‘Astronomy Instrumentation’ section; must be “of interest to a sizable fraction of the A&A audience”; 2. Issue of VO tools to be discussed soon by editors; 3. “Descriptions of new software appear only if accompanied by new science derived using it”; 4. “[O]ur enthusiasm for techniques papers tend to fall off as they become less concerned with direct results and more divorced from ongoing science projects”, but OK if “the paper will be interesting even if the particular instrument never actually gets built”; 5. Might be considered for a WWT special issue; 6. “The topics ... easily fall under the focus of this journal. [...] We consider astronomy informatics a sister domain, related to Earth Science Informatics”; 7. “[D]efinitely in the scope” of DSJ; 8. “We have indeed accepted articles such as the 5 that you sent”. No replies were received from Experimental Astronomy or from Astronomische Nachrichten.

4. Summary of BoF discussion

Opinion varied widely as to the necessity of a new journal, but there was general enthusiasm at the idea of participating – as readers, authors, referees, and, in some cases, as editors – in such a new journal, if one were to exist.

Some people felt that the increasing importance of computational techniques in astronomy today necessitates the creation of a dedicated journal, and the analogy was made with particle physics, which has long since made a definite split between journals for science results and journals for technical material (experimental details, as well as analysis software, etc). The latter stream is highly valued, both for providing a means of sharing and recording technical knowledge, and for rewarding the efforts of more

technical staff, prompting the suggestion that astronomy would benefit from the same system. The case was made that previous attempts to provide such outlets have not met with great enthusiasm from the ADASS community. The AIP’s “Computers in Physics” journal had a similar intention to that proposed here (although covering all of physics, rather than just astronomy), but few astronomy-related papers were published there, and the same goes now for *Experimental Astronomy*.

There was general agreement that the ADASS community would benefit from producing more refereed papers, but most people felt that the opportunities provided by existing journals should be exhausted before serious consideration is made of starting a new one. This might even be coordinated – whether through the dedication of special issues, or more informally amongst authors – in an attempt to produce a journal with a critical mass of material about astronomy computing. It is not clear whether the increasing importance of this domain is better highlighted by the creation of a dedicated journal, or by making a significant presence within an existing journal.

Many people see PASP as the most appropriate outlet for papers on topics requiring a fuller treatment than allowed by the ADASS proceedings, and others mentioned that papers on algorithms can find a home in mainstream astronomy journals, so the problem of *excluded* material is largely restricted to descriptions of pipeline software and the like, whose details should be recorded and made available to their users, but which may lack the conceptual novelty required by most journals (that is, problem 3 may apply only to articles of type **pipe** in Table 1). This both records and advertises the authoring software group’s contributions to the astronomical enterprise.

A requirement was identified for an outlet for publishing lessons learnt of the “we did this, but it didn’t work because of these reasons” sort. That could be provided by a non-refereed section of a new journal, or, equally, by postings to astro-ph. There is already an “instruments and methods” chapter there, that is currently poorly used by the ADASS community, but it could be transformed by greater use into a suitable vehicle for knowledge exchange within the community.

Another advantage of publishing in astro-ph is that research astronomers are used to looking there, which would be an advantage for some papers in this domain, although, equally, some others may benefit more from publication in a journal (such as *Earth Sciences Informatics* or *CODATA Data Science Journal*) that is read by people working on analogous topics in related domains.

5. Conclusions

Our survey reveals that, although the high-impact ‘big three’ journals do not see ADASS material as naturally in their scope, there are other journals which would be perfectly willing to consider articles, and that conclusion was shared by the BoF participants. There seems little present need for a new journal.

The key question then becomes number 4: why does the community not publish in the journals that are available to it? We look forward to a spike in astrophysics journal articles in 2011.

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